

30 025 43841

Oxy USA Inc.

**Lea County, NM
North Hobbs G/SA Unit
NHU 24-657**

Wellbore #1

Survey: Scout MWD

Standard Survey Report

15 November, 2017

**HOBBS OCD
FEB 12 2018
RECEIVED**



a business unit of Turbo Drill Industries, Inc.



Project: Lea County, NM
 Site: North Hobbs G/SA Unit
 Well: NHU 24-657
 Depth Reference: GL 3674.4' + 17.5' KB @ 3691.90usft (Trinidad 435)
 SHL Northing: 634663.65
 SHL Easting: 847524.56
 Rig: Trinidad 435
 Plan: plan1



SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Annotation
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1800.00	0.00	0.00	1800.00	0.00	0.00	0.00	0.00	0.00	Start Build 2.00
2453.96	13.08	273.03	2448.30	3.93	-74.21	2.00	273.03	74.32	Start 1492.11 hold at 2453.96 MD
3946.07	13.08	273.03	3901.70	21.80	-411.41	0.00	0.00	411.98	Start Drop -2.00
4600.04	0.00	0.00	4550.00	25.73	-485.62	2.00	180.00	486.30	Start 50.00 hold at 4600.04 MD
4650.04	0.00	0.00	4600.00	25.73	-485.62	0.00	0.00	486.30	TD at 4650.04' MD

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
291.90	291.90	Triassic Red Beds
1511.90	1511.90	Rustler
1641.90	1641.90	SALT
2741.90	2755.38	Yates
2961.90	2981.24	Seven Rivers
3491.90	3525.36	Queen
3781.90	3823.08	Grayburg
4041.90	4089.24	San Andres (Zone 1)
4211.90	4261.15	San Andres (Zone 3 upper)
4521.90	4571.94	San Andres (Zone 3 lower)

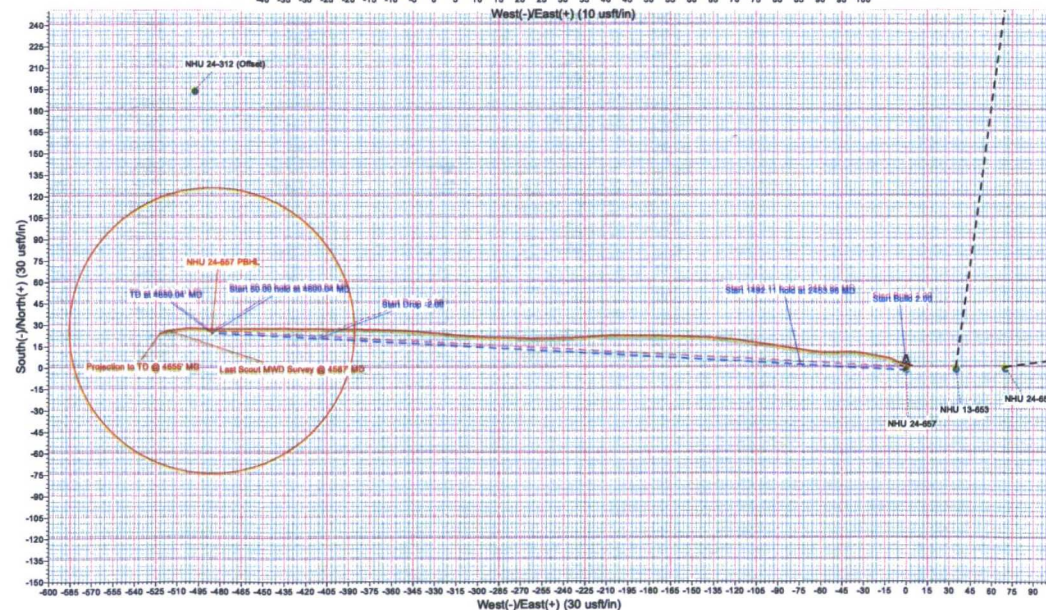
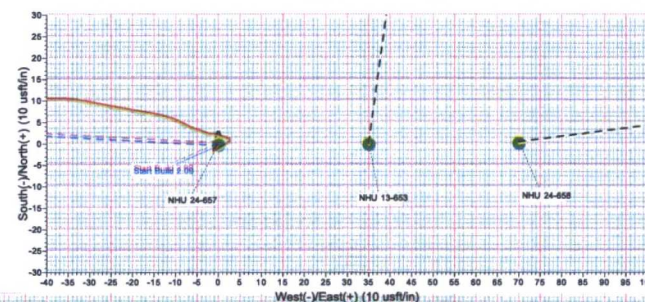
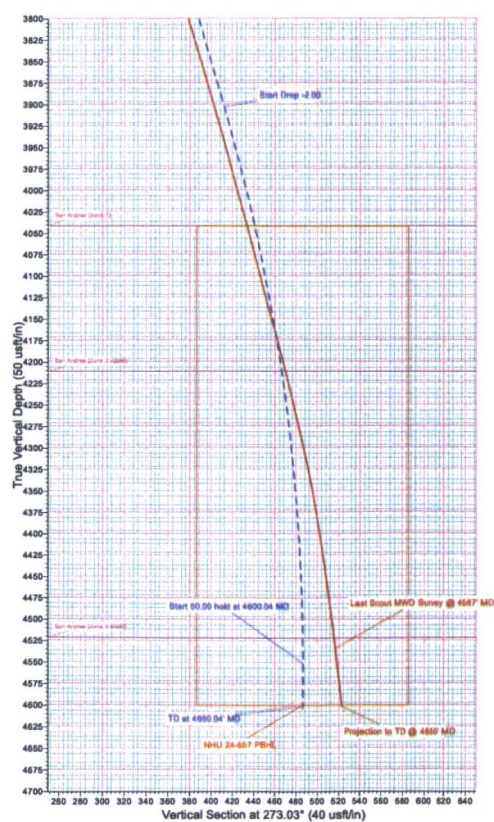
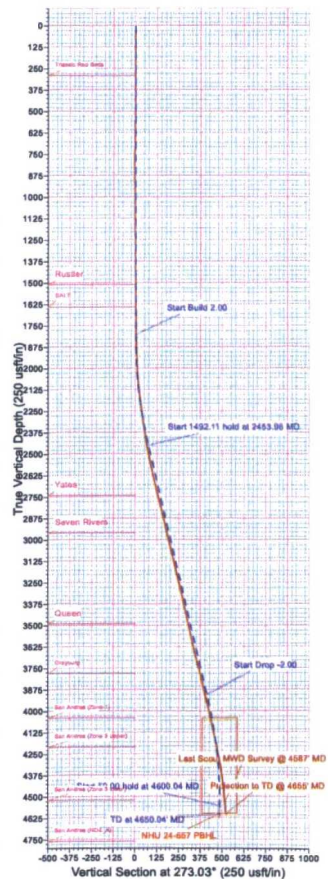
DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting
NHU 24-657 PBHL	4600.00	25.73	-485.62	634689.38	847038.94



Azimuths to Grid North
 True North: -0.61°
 Magnetic North: 6.31°

Magnetic Field
 Strength: 48204.4nT
 Dip Angle: 60.77°
 Date: 2017/10/18
 Model: HDGM



Survey Report



Company:	Oxy USA Inc.	Local Co-ordinate Reference:	Well NHU 24-657
Project:	Lea County, NM	TVD Reference:	GL 3674.4' + 17.5' KB @ 3691.90usft (Trinidad 435)
Site:	North Hobbs G/SA Unit	MD Reference:	GL 3674.4' + 17.5' KB @ 3691.90usft (Trinidad 435)
Well:	NHU 24-657	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	EDM 5000.14 Single User Db

Project	Lea County, NM		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site		North Hobbs G/SA Unit			
Site Position:		Northing:	634,663.65 usft	Latitude:	32° 44' 22.880 N
From:	Map	Easting:	847,524.56 usft	Longitude:	103° 12' 11.270 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.61 °

Well	NHU 24-657					
Well Position	+N/-S	0.00 usft	Northing:	634,663.65 usft	Latitude:	32° 44' 22.880 N
	+E/-W	0.00 usft	Easting:	847,524.56 usft	Longitude:	103° 12' 11.270 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	3,674.40 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	2017/10/18	6.92	60.77	48,204.40000000

Design	Surveys				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.00	0.00	0.00	273.03	

Survey Program	Date 2017/11/15				
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
178.00	4,655.00	Scout MWD (Wellbore #1)	MWD+HRGM	OWSG MWD + HRGM	

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
178.00	0.97	217.58	177.99	-1.19	-0.92	0.85	0.54	0.54	0.00	
363.00	0.48	52.87	362.98	-1.97	-1.26	1.15	0.78	-0.26	-89.03	
546.00	0.66	59.99	545.98	-0.98	0.27	-0.32	0.11	0.10	3.89	
730.00	0.75	58.94	729.96	0.17	2.22	-2.20	0.05	0.05	-0.57	
913.00	0.44	289.74	912.96	1.03	2.58	-2.52	0.59	-0.17	-70.60	
1,097.00	0.48	282.71	1,096.95	1.44	1.16	-1.09	0.04	0.02	-3.82	
1,284.00	0.40	294.66	1,283.95	1.88	-0.19	0.29	0.06	-0.04	6.39	
1,449.00	0.48	267.94	1,448.94	2.10	-1.41	1.52	0.13	0.05	-16.19	

Survey Report



Company:	Oxy USA Inc.	Local Co-ordinate Reference:	Well NHU 24-657
Project:	Lea County, NM	TVD Reference:	GL 3674.4' + 17.5' KB @ 3691.90usft (Trinidad 435)
Site:	North Hobbs G/SA Unit	MD Reference:	GL 3674.4' + 17.5' KB @ 3691.90usft (Trinidad 435)
Well:	NHU 24-657	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	EDM 5000.14 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
1,569.00	0.48	286.92	1,568.94	2.23	-2.39	2.50	0.13	0.00	15.82
1,695.00	0.70	292.11	1,694.93	2.67	-3.61	3.74	0.18	0.17	4.12
1,821.00	1.01	286.40	1,820.92	3.27	-5.39	5.55	0.25	0.25	-4.53
1,947.00	2.51	299.14	1,946.85	4.93	-8.86	9.11	1.22	1.19	10.11
2,072.00	4.48	278.93	2,071.62	7.02	-16.08	16.42	1.84	1.58	-16.17
2,196.00	8.13	281.30	2,194.85	9.49	-29.46	29.92	2.95	2.94	1.91
2,322.00	7.60	264.78	2,319.68	10.48	-46.50	46.99	1.84	-0.42	-13.11
2,448.00	9.76	277.17	2,444.24	11.05	-65.40	65.89	2.26	1.71	9.83
2,573.00	12.22	279.54	2,566.94	14.57	-88.96	89.61	2.00	1.97	1.90
2,699.00	13.58	277.61	2,689.75	18.74	-116.77	117.60	1.13	1.08	-1.53
2,824.00	14.59	271.63	2,811.00	21.13	-147.06	147.97	1.42	0.81	-4.78
2,950.00	12.53	272.16	2,933.48	22.10	-176.58	177.51	1.64	-1.63	0.42
3,076.00	13.36	268.12	3,056.28	22.13	-204.79	205.68	0.97	0.66	-3.21
3,202.00	13.49	265.48	3,178.84	20.50	-233.99	234.75	0.50	0.10	-2.10
3,327.00	13.01	273.04	3,300.52	20.10	-262.58	263.28	1.44	-0.38	6.05
3,453.00	11.96	270.49	3,423.54	20.96	-289.80	290.50	0.94	-0.83	-2.02
3,578.00	12.48	276.03	3,545.71	22.49	-316.18	316.93	1.03	0.42	4.43
3,704.00	13.98	274.27	3,668.37	25.05	-344.90	345.74	1.23	1.19	-1.40
3,830.00	13.98	270.67	3,790.64	26.36	-375.30	376.17	0.69	0.00	-2.86
3,956.00	12.88	270.23	3,913.19	26.60	-404.56	405.40	0.88	-0.87	-0.35
4,081.00	12.00	270.93	4,035.25	26.87	-431.49	432.30	0.71	-0.70	0.56
4,205.00	12.26	269.70	4,156.48	27.01	-457.54	458.33	0.30	0.21	-0.99
4,332.00	10.68	270.23	4,280.94	26.98	-482.79	483.54	1.25	-1.24	0.42
4,459.00	7.16	273.48	4,406.39	27.51	-502.47	503.22	2.80	-2.77	2.56
4,587.00	5.49	249.04	4,533.63	25.80	-516.15	516.79	2.45	-1.30	-19.09
Last Scout MWD Survey @ 4587' MD									
4,655.00	5.49	249.04	4,601.32	23.48	-522.23	522.74	0.00	0.00	0.00
Projection to TD @ 4655' MD									

Survey Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
4,587.00	4,533.63	25.80	-516.15	Last Scout MWD Survey @ 4587' MD
4,655.00	4,601.32	23.48	-522.23	Projection to TD @ 4655' MD

Checked By: _____ Approved By: _____ Date: _____